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CORDILLERAN SECTION OF THE GEOLOGICAL SOCIETY OF AMERICA.*

A YEAR ago, as has been already reported in SCIENCE, about a dozen west coast geologists met at Berkeley and organized the Cordilleran Geological Club. The organization was at once recognized as temporary, and the project of organizing permanently as a Section of the Geological Society of America formed a leading topic of discussion at the meeting. The following spring a number of fellows of the Society resident in California memorialized the Council of the Society, setting forth their inability to be present at the meeting of the Society owing to the great distance at which they reside from the usual places of meeting, and praying for legislation on the part of the Society which would enable them to meet as a geographically distinct Section of the Society. The Section was formally recognized by the Society at its Washington meeting, and the Council of the Society was authorized to frame rules governing the Section in its relations to the main Society.

The meeting of the Cordilleran Section was very successful, and it is clear that its organization will greatly strengthen the Society in the West. Provisionally Professor Joseph Le Conte was elected Chairman, Andrew C. Lawson, Secretary, and Professor J. E. Talmage, Councilor, the three to constitute an executive committee.

The following papers were presented :

The discovery of a goat antelope in the cave fauna of Pike's Peak region. By F. W. CRAGIN, Colorado Springs, Colo.

In having the cave-earth removed from a cave in the Manitou limestone of his Glen Eyrie estate a few years since, General W. J. Palmer saved organic remains, consisting of a number of bones, and submitted them to the writer for determination. Two of the specimens belonged to a slender-

* First annual meeting, San Francisco, Calif., December 29 and 30, 1899.

limbed horse of the late Pliocene or Quaternary age. Other remains belong to a species of woodchuck, probably different from any now living in North America. A humerus and cannon bone of a two-toed ungulate were found to differ from the corresponding bones of all the artiodactyles now living in North America, but agreed closely with those of the Capricorn or Goat-Antelope (*Nemorhædus*) of the Himalayan region. In recognition of General Palmer's liberal patronage of science the species is named *N. palmeri*.

The finding of goat antelopes in the extinct fauna of the Rocky Mountains, though unexpected, is no more remarkable than the occurrence of elephants, which are also of Oriental origin.

On the occurrence of ground-sloths in the Quaternary of Middle California. By JOHN C. MERRIAM, Berkeley.

The remains of two ground-sloths have recently been obtained from Middle Californian deposits of unquestioned Quaternary age. The first specimens found consisted of large humerus fragments obtained by Judge Jones, of Martinez, Calif., on the south shore of Suisun Bay. Associated with them were remains of *Elephas* and a large species of *Equus*. During the past year, 1899, Mr. A. Huff obtained a large and perfectly preserved humerus from loose, horizontally stratified deposits on the eastern shore of Tomales Bay, in Marin County, Calif. An *Elephas* tooth seems to have been obtained from the same deposit.

The specimens from the two localities seem to belong to the same or closely related species. This form fits most satisfactorily into Marsh's genus *Morotherium*, which was described from material obtained in Alameda County, Calif.

Classification of the John Day beds. By JOHN C. MERRIAM, Berkeley.

The John Day beds average about fif-

teen hundred feet in thickness, and apparently contain a very large proportion of volcanic materials. They seem to rest unconformably on a thick series of plant bearing, fresh water beds, which have been considered Eocene. The Columbian lavas rest apparently unconformably upon the John Day beds.

On the basis of lithologic and stratigraphic characters, the John Day System may be divided into three divisions, lower, middle, and upper John Day. The lower beds are mainly colored a brilliant red, seem to have suffered more disturbance than the higher beds and are practically barren of fossils. The middle beds are blue, green or drab, and are in places quite fossiliferous. The upper beds are bluff or white. They are largely made up of volcanic material. Many fossils have been obtained from this division. One horizon particularly is rich in rodent remains.

The writer's study of the vertical range of the John Day species has not progressed far enough to permit of any definite statement regarding their zonal arrangement. Professor J. L. Wortman has already proposed the division of the system, on faunal grounds, into upper *Merycochaerüs* and lower *Diceratherium* beds. The use of the lithologic divisions here proposed will greatly aid in the study of the vertical range or history of John Day species.

Notes concerning erosion forms and exposures in the deserts of South Central Utah. By J. E. TALMAGE, Salt Lake City, Utah.

A description of the effects of denudation in the region lying east and south of the Thousand Lake Mountain, and west of the water pocket fold. The dissection of the Trias and Jura was illustrated by numerous photographs. In the work of rock disintegration much importance was attached to the great diurnal range of temperature, the range being 80° to 85° F. during the autumn

months. Dykes and hills are prominently exposed in certain parts of the region. Selenite geodes similar to that first reported in SCIENCE, February 17, 1893, are of frequent occurrence.

On certain peculiar markings on sandstones from the vicinity of Elen Cañon, Arizona.

By J. E. TALMAGE, Salt Lake City, Utah.

The paper was illustrated by photographs and slabs of the rock. The markings appear as right lines with approximately rectangular intersections; the lines are shallow troughs from .5 mm. to 2 mm. in width though occasionally in coarser rocks they are as much as 9 mm. wide and 3 mm. deep. The rectangles have an average size of about 4x6 mm. Unbroken lines of 395 cm. have been traced. The rock is a fine-formed argillaceous sandstone of brick red to chocolate color. It occurs as a bed two feet thick between coarser sandstones. Ripple marks, rain drop impressions and sun cracks appear in the marked rock.

Attempts to reproduce the right line markings were described, leading to the conclusion that the lines are perhaps the result of crystalline cleavages in saline cakes deposited through desiccation. Pinate impressions suggesting frost flower pictures occur with the right line markings and these were reproduced experimentally. Slabs of the stone 2½ square yards in size and completely covered with the right lines were taken from the deposit.

Conglomerate 'puddings' from the Paria River, Utah. By J. E. TALMAGE, Salt Lake City, Utah.

The paper was an explanation of photographs, showing a number of fresh conglomerate masses, consisting of pebbles and mud formed by accretion through rolling. The formation of these puddings was observed on the mud flats of the Paria. The sticky mud and river, worn pebbles readily cohere, and by rolling the lumps, increase in size

and were found ranging in size from three inches to two feet in diameter. When left to dry they fall to pieces. Some were observed partly buried in the mud; and it is probable that many have been covered up by flood deposits.

Thomsonite and other zeolites from Golden, Colorado. By HORACE B. PATTON, Golden, Colo.

The points of interest are remarkably beautiful and delicate masses of Thomsonite recently found, and the extraordinary variety in habit of this material in the same and closely adjacent cavities. The paper was accompanied by photographs.

The peneplain question upon the Pacific Coast. By H. W. FAIRBANKS, Berkeley, Calif.

A topographic study of the islands of Southern California. By W. S. TANGIER SMITH, Berkeley, Calif. Presented by Andrew C. Lawson.

The islands are classified according to their general physiographic features, and the main reasons for the pronounced differences found are given. The physiography of each island is then considered in some detail, and a general description of the submarine features of the coast of California (particularly in the south) is also given. This is followed by a consideration of the chief conditions governing the formation and preservation of terraces and other wave-formed features. Finally, the most recent movements of the coast are considered, with the conclusion that the islands have moved in unison with the mainland.

An early geological excursion. By JOSEPH LE CONTE, Berkeley, Calif.

An informal narrative of a camping trip in 1844 to Lake Superior, thence up the St. Louis river, thence by portage into the upper tributaries of the Mississippi, thence down that river to Fort Snelling, thence by steamer to Galena, St. Louis, and Pittsburg,

and finally by rail back to New York. The paper was of interest chiefly from a historical point of view. For example: The writer went to Lake Superior with the first mining party (Colonel Gratiot's) that opened the Lake Superior copper mines and camped with the party for three weeks at Eagle Harbor. After leaving Eagle Harbor on a canoe trip of about 800 miles, only three or four white men were seen. The canoe was drawn up on the very spots where Duluth and Minneapolis now stand, but many years before those cities existed. Many important geological observations were made and recorded for the first time, but the writer was too young to appreciate their full significance.

Some coast migrations, Southern California. By BAILEY WILLIS, Washington, D. C.

The sequence of events discussed in the paper includes (1) the development of the Santa Lucia series; (2) erosion of the Santa Lucia series; (3) deposition of the Franciscan conglomerate, sandstone and shale; (4) orogenic movements which resulted in profound deformation of the Franciscan formations; (5) deep erosion of the Santa Lucia and Franciscan rocks, which is partly represented in later sediments; (6) evolution of the present mountain system and coastal front. The paper presents observations made during a trip from Monterey to San Luis Obispo along the intervening coast ranges. The writer was accompanied by Dr. H. W. Fairbanks, in whose articles many of the facts presented have already been published.

The sandstone reefs of Brazil. By J. C. BRANNER, Stanford University.

The geological significance of soil study. By E. W. HILGARD, Berkeley, Calif.

This paper discusses, first, the importance and convenience of observations on soil areas and their characteristic vegetation, in the delineation of geological formations. It

then treats of the chemico-geological relations between the latest geological formations, soils, and the more ancient deposits which, after emergence, have been subject to subaërial agencies.

The American Devonian placoderms. By E. W. CLAYPOLE, Pasadena, Calif.

Following a detailed discussion of the structure and relationships of the principal Devonian genera of North American placoderms, the author presented his views on the habits, habitat, origin and migrations of the great armor-clad forms.

The Berkeley Hills—a detail of Coast Range geology. By ANDREW C. LAWSON, Berkeley, Calif.

A discussion of the geological history and structure of the hills in the vicinity of Berkeley, accompanied by a colored map on a scale of 1:12,000 and six geological sections.

ANDREW C. LAWSON,
Secretary.

PROFESSOR HENRY ALLEN HAZEN.*

By a sad accident on the evening of Monday, January 22d, the Weather Bureau lost one of its most prominent officials. Professor Henry Allen Hazen, while riding rapidly on his bicycle, hastening to his night work at the Weather Bureau, collided with a pedestrian and was dashed to the ground. After lying unconscious for twenty-four hours, he expired on the 23d. His body is interred in the family burying-ground at Deerfield, Massachusetts.

Professor Hazen was born, January 12, 1849, in Sirur, India (about 100 miles east of Bombay), the son of Reverend Allen Hazen, a missionary of the Congregational Church. He came to this country when ten years old and was educated at St. Johnsbury, Vermont, and at Dartmouth College, where he was graduated in 1871. After this, he removed to New Haven and

* From advance sheets of the *Monthly Weather Review*.

was for four years instructor in drawing in the Sheffield Scientific School, and for four years subsequent was assistant in meteorology and physics under Professor Elias Loomis. He was also privately associated with the latter in meteorological researches and the preparation of many of the 'Contributions to Meteorology,' published by Professor Loomis, some of which bear evidence of the reflex influence of the student on the master.

In the spring of 1881, when the present writer first saw Professor Hazen in New Haven, the latter showed such an earnest interest in meteorology as to justify recommending him to the position of computer in the 'Study Room' which was then being organized by General William B. Hazen the Chief Signal Officer, for the purpose of developing the scientific work of the Bureau, as a necessary adjunct to its important practical work. After his entry (May, 1881) into the meteorological work of the Signal Service, Professor Hazen took a prominent part in this field. The special works assigned to him (such as the deduction of altitude by railroad levels, the study of the psychrometer, the proper exposure of thermometers, the study of thunderstorms, annual courses of lectures on meteorology), were by no means sufficient to absorb his energies, and we find him branching off into many other subjects, such as barometric hypsometry and the reduction to sea-level, the testing of anemometers, the study of tornadoes and the theories of cyclones, atmospheric electricity, balloon ascensions, the influences of sunspots and the moon, the danger lines of river floods, the sky glows and the eruption of Krakatoa. His enthusiastic advocacy of the importance of the balloon to meteorology was very highly appreciated. His five ascensions (1886, June 24, 25; 1887, June 17 and August 13; 1892, October 27), undoubtedly gave very accurate temperatures and humidities.